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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,130	09/08/2003	Makoto Higashikawa	00839.000419.1	8647

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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT PAPER NUMBER

1763

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,130

Applicant(s)

HIGASHIKAWA ET AL.

Examiner

Maureen G. Arancibia

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/261,499.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification, specifically the listing of "Applied Physics-related joint lecture meetings" in Paragraph 11 of the Specification, is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

2. The drawings are objected to because reference character "**103b**" in Figure 1 should be corrected to "**113b**". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either

"Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1-5 are objected to because of the following informalities: It appears that the phrase "whereby a glow" should be deleted from the last line of Claim 1. On Line 2 of Claim 2, the word "in" should be deleted, so that the line reads "electrodes are arranged such that they are parallel to each other." Claims 3-5 are objected to due to their dependence on Claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-5 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said glow discharge" in Line 7. There is insufficient antecedent basis for this limitation in the claim. Claims 2-5 are rejected due to their dependence on Claim 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,652,029 to Itoh (from Applicant's IDS) in view of Japanese Patent Application Publication 09-256160 to Takaki et al. (from Applicant's IDS). The following rejection refers to the English Machine Translation (EMT) of Takagi et al.

Itoh teaches an apparatus for forming a thin film on a substrate, comprising a plurality of bar shaped electrodes 400, 401, 402, 403, 404 opposed to a substrate 115 in a vacuum chamber 101, arranged such that they are perpendicular to a normal line of said substrate and their intervals x_1 , x_2 , x_3 , x_4 , x_5 to said substrate are all different (Figure 6), and a high frequency power source 108 for causing glow discharge.
(Column 3, Line 43-48; Column 8, Lines 48-60)

The apparatus taught by Itoh would be inherently capable of forming a microcrystalline silicon series thin film in a deposition process on the substrate 115, as recited in the preamble of Claim 1. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

Itoh does not expressly teach that the high frequency power can be in the range of 50 to 550 MHz.

Takaki et al. teaches that the high frequency power supplied to a plurality of bar shaped electrodes 204 can be in the range of 30 to 600 MHz. (EMT, Paragraphs 46-47)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by Itoh to have the high frequency power be in the range of 30 to 600 MHz (which encompasses the claimed range), as taught by Takaki et al. The motivation for making such a modification, as taught by Takaki et al. (EMT, Paragraphs 33, 34, and 46-48), would have been to combine the high deposition rate made possible by the high frequency power with the uniformity of deposition made possible by the arrangement of the electrodes.

In regards to Claims 2 and 3, Itoh teaches that the plurality of bar shaped electrodes are arranged such that they are parallel to each other and perpendicular to a transportation direction of the substrate. (Figure 6; Column 5, Line 66 - Column 6, Line 2)

In regards to Claims 4 and 5, Itoh teaches that the plurality of bar shaped electrodes are arranged such that their intervals are periodically changed relative to a transportation direction of the substrate, with the intervals to the substrate wider in an upper side of a transportation direction (x_1 , x_2 , x_3) and narrower in a down side of a transportation direction (x_4 , x_5). (Figure 6; Column 3, Line 43-48; Column 8, Lines 48-60)

9. **Claims 1-5 rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent 6,076,481 to Yamagami et al. ('481) in view of Itoh, or in the alternative U.S. Patent 6,152,071 to Akiyama et al. ('071) in view of Itoh, or in the alternative U.S. Patent 6,065,425 to Takaki et al. ('425; from Applicant's IDS) in view of Itoh, or in the alternative U.S. Patent 6,279,504 to Takaki et al. ('504) in view of Itoh.**

The applied references (except Itoh) each have a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the

application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Each of '481, '071, '425, and '504 teach an apparatus for forming a thin film on a substrate, comprising a plurality of bar shaped electrodes opposed to a substrate in a vacuum chamber, arranged such that they are perpendicular to a normal line of said substrate and a high frequency power source overlapping or encompassing the claimed range for causing glow discharge. ('481, Figure 22A and Column 12, Lines 32-59; '071, Figure 6, Column 12, Lines 5-27; '425, Figure 8, Column 10, Lines 33-35 and 52-58; '504, Figure 9, Column 7, Lines 57-60, Column 8, Lines 27-34)

The apparatuses taught by each of '481, '071, '425, and '504 would be inherently capable of forming a microcrystalline silicon series thin film in a deposition process on the substrate, as recited in the preamble of Claim 1. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 1, 4, and 5, none of '481, '071, '425, and '504 expressly teaches that the intervals of the electrodes to the substrate are all different or in part different, or specifically that the intervals are periodically changed relative to a

transportation direction of the substrate, with the intervals to the substrate wider in an upper side of a transportation direction and narrower in a down side of a transportation direction.

Itoh teaches an apparatus for forming a thin film on a substrate, comprising a plurality of bar shaped electrodes 400, 401, 402, 403, 404 opposed to a substrate 115 in a vacuum chamber 101, arranged such that they are perpendicular to a normal line of said substrate and their intervals x_1 , x_2 , x_3 , x_4 , x_5 to said substrate are all different (Figure 6). (Column 3, Line 43-48; Column 8, Lines 48-60) Itoh teaches that the plurality of bar shaped electrodes are arranged such that their intervals are periodically changed relative to a transportation direction of the substrate, with the intervals to the substrate wider in an upper side of a transportation direction (x_1 , x_2 , x_3) and narrower in a down side of a transportation direction (x_4 , x_5). (Figure 6; Column 3, Line 43-48; Column 8, Lines 48-60)

It would have been obvious to one of ordinary skill in the art to modify each of the apparatuses taught by '481, '071, '425, and '504 to vary the intervals of the electrodes to the substrate in the manner taught by Itoh. The motivation for making such a modification, as taught by Itoh (Column 8, Line 65 - Column 9, Line 16), would have been to optimize the distribution in hardness of the deposited film as the substrate is moved past the electrodes.

In regards to Claims 2 and 3, each of '481, '071, '425, and '504 teaches that the plurality of bar shaped electrodes are arranged such that they are parallel to each other

and perpendicular to a transportation direction of the substrate. ('481, Figure 22A; '071, Figure 6; '425, Figure 8; '504, Figure 9)

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-5 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 25 and 26 of U.S. Patent 6,076,481 to Yamagami et al. ('481) in view of Itoh, or in the alternative over Claims 6 and 7 of U.S. Patent 6,065,425 to Takaki et al. ('425) in view of Itoh, or in the alternative over Claims 5 and 12 of U.S. Patent 6,279,504 to Takaki et al. ('504) in view of Itoh.

Claims 25 and 26 of '481, Claims 6 and 7 of '425, and Claims 5 and 12 of '504 each recite all of the limitations of Claims 1-5 of the instant application, except that the intervals of the electrodes to the substrate are all different or in part different, or specifically that the intervals are periodically changed relative to a transportation

direction of the substrate, with the intervals to the substrate wider in an upper side of a transportation direction and narrower in a down side of a transportation direction.

Itoh teaches an apparatus for forming a thin film on a substrate, comprising a plurality of bar shaped electrodes 400, 401, 402, 403, 404 opposed to a substrate 115 in a vacuum chamber 101, arranged such that they are perpendicular to a normal line of said substrate and their intervals x_1 , x_2 , x_3 , x_4 , x_5 to said substrate are all different (Figure 6). (Column 3, Line 43-48; Column 8, Lines 48-60) Itoh teaches that the plurality of bar shaped electrodes are arranged such that their intervals are periodically changed relative to a transportation direction of the substrate, with the intervals to the substrate wider in an upper side of a transportation direction (x_1 , x_2 , x_3) and narrower in a down side of a transportation direction (x_4 , x_5). (Figure 6; Column 3, Line 43-48; Column 8, Lines 48-60)

It would have been obvious to one of ordinary skill in the art to modify each of the apparatuses recited in Claims 25 and 26 of '481, Claims 6 and 7 of '425, and Claims 5 and 12 of '504 to vary the intervals of the electrodes to the substrate in the manner taught by Itoh. The motivation for making such a modification, as taught by Itoh (Column 8, Line 65 - Column 9, Line 16), would have been to optimize the distribution in hardness of the deposited film as the substrate is moved past the electrodes.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571)

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272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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